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OPERATIONAL FLEXIBILITY AS A CRISIS RESPONSE TO MANAGE ORGANIZATIONS IN EXTREME UNCERTAINTIES SIMILAR TO COVID-19 PANDEMIC SITUATION

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BACKGROUND

The extent of the COVID-19 pandemic is unprecedented. The frequency of change (i.e., daily COVID-19 incidences) was unpredictable across different world regions. This led to varying response patterns, with some being radical, such as complete business shutdowns in certain regions. Despite these variations, what is common is that the COVID-19 disruption has challenged organizational business models. What can be learned from the varying organizational response? In particular:

- What are some lessons learned from the COVID-19 pandemic, and how do they inform an organization's sustainable operations under crisis conditions?
- What are elements of an organization's operating model that allow flexible responses to disruptive events?

We draw insights into these questions by analyzing data from a survey of international organizations administered during the COVID-19 pandemic. The insights will enable managers to guide their organizations under uncertain conditions. Our results represent the starting point of informing an operating model that enables organizational flexibility during unforeseen events.

RESPONDING TO THE CRISIS AND EXTREME UNCERTAINTY

During the COVID-19 crisis, business struggles were covered extensively in the popular press.[1, 2] The extreme nature of the pandemic evolved into an 'existential crisis'; the existence of firms themselves was at stake.[3] The stake was prominent when especially as shutdowns were ordered by policymakers to curb the pandemic. There have been recent crises – cyber-attacks, economic meltdowns, safety failures, stock market collapse, or other natural disasters [4] – however, these have been confined to limited geographical locations or within specific industries with a temporally decreasing magnitude after the crisis. However, the COVID-19 pandemic led to global uncertainty, spreading across all countries and affecting multinational organizations and conglomerates alike.

The International Monetary Fund estimates the pandemic's impact on 2020 GDP growth as -4.4%, a distinct difference from the 2.8% growth in 2019.[5] Compounding the decline was the nature of the change itself, an almost immediate cliff conversion with extreme high uncertainty. Rapidly developing public health concerns and changing policy declarations also affected firms. Not only had managers not experienced such a global phenomenon, but they also had to scramble to develop solutions in an evolving environment. Also, potential solutions had to consider multiple factors such as public health policies, demand shifts, supply chain shutdowns, and unstable front-end sales and service channels.

Standard operating principles are primarily designed to reduce uncertainty through established routines. However, during the COVID-19 crisis, standard processes no longer fit the evolving and dynamic environment, with uncertainty reaching levels never experienced before. Organizations were forced to adapt not just to maintain operations but to fight for their survival. The crisis required an immediate shift to new structures and models of operation and coordination[6].

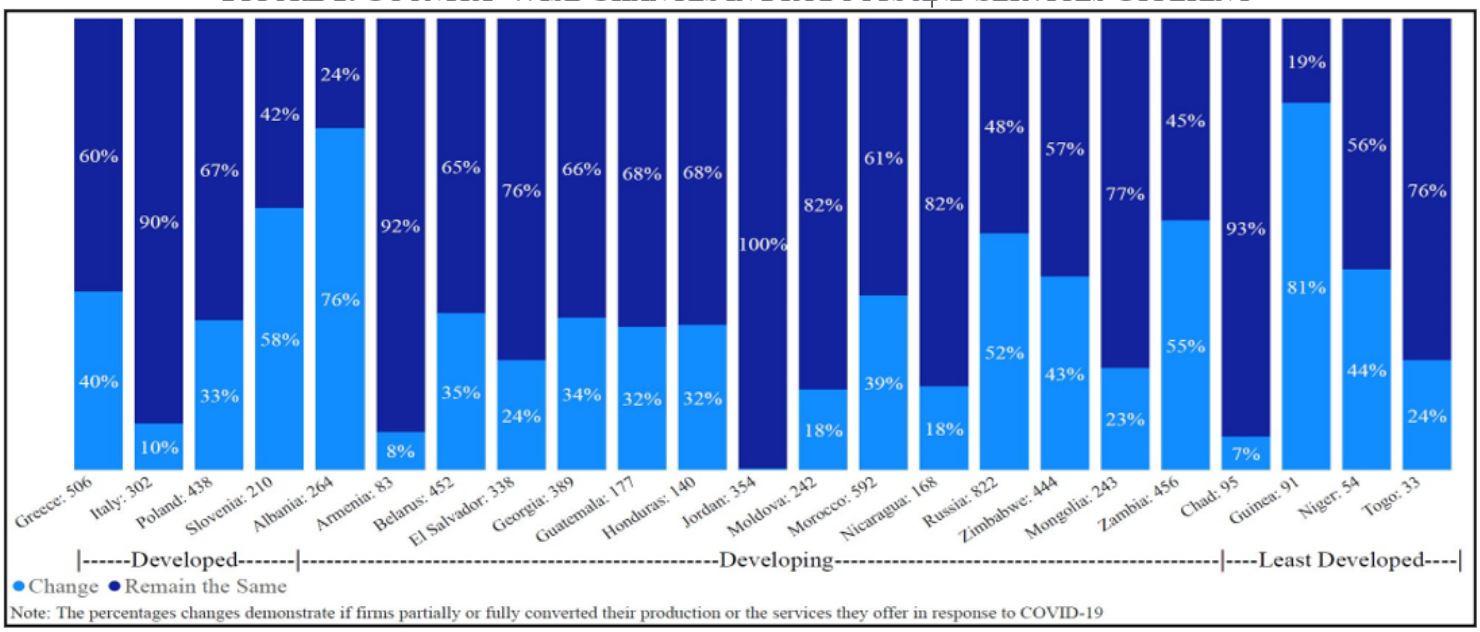
WHY EXISTING OPERATING MODELS FALL SHORT DURING CRISIS?

Unanticipated crises, large or small, can have far-reaching impacts on organizations.[7] Firms must rise to the challenge to survive, considering adjustments in strategies, budgets, and business models. The ability for firms to adapt is based on the flexibility of their business and operating models. This is accomplished through the management and technological resources that form a firm's resiliency and elasticity capability.

An organization's structure and operating model may not support appropriate adaptation during a crisis due to its rigidity to change. Also, an organization's desire to preserve itself during a threat can lead to rigidity through conservation of resources, suboptimal decision making, and conservative employee and management behavior.[8] We argue that flexibility – the capability to act and collaborate quickly across a firm when challenges arise – will enable a firm to

[1] Simon, R., 2020. "For Small Firms, Covid-19 Cuts Deeper; It's Getting Worse Every Day," *The Wall Street Journal.* pp. 1-10.
[2] Casselman, B., Cohen, P., Cowley, S. 2020. "Coronavirus Cost to Businesses and Workers: It Has All Gone to Hell," *The New York Times*.
[3] Donthu, N., and Gustafsson, A. 2020. "Effects of COVID-19 on Business and Research," *Journal of Business Research* (117:2), pp. 284-289.
[4] Salines, M., Glöckler, G., and Truchlewski, Z. 2012. "Existential Crisis, Incremental Response: The Eurozone's Dual Institutional Evolution 2007–2011," *Journal of European Public Policy* (19:5), pp. 665-681.
[5] https://www.imf.org/en/Publications/WEO/weo-database/2020/October.
[6] Fredericks, E. 2005. "Infusing Flexibility into Business-to-Business Firms: A Contingency Theory and Resource-Based View Perspective and Practical Implications," *Industrial Marketing Management* (34:6), pp. 555-565.
[7] Wang, J. 2008. "Developing Organizational Learning Capacity in Crisis Management," *Advances in Developing Human Resources* (10:3), pp. 425-445.
[8] Mishra, Al. 2008. "Organizational Responses to Crisis: The Centralizty of Trust," *In Trust in Organizations: Frontiers of Theory and Research*, Edited by R. Kramer and T. Tyler, Sage.

FIGURE 1. COUNTRY-WISE CHANGES IN PRODUCTS AND SERVICES OFFERING



Note: The percentages changes demonstrate if firms partially or fully converted their production or the services they offer in response to COVID-19

	Mean ± SD (N)	T-value
Least Developed vs. Developed	0.41 ± 0.49 (273)	2.28**
Least Developed vs. Developing	0.43 ± 0.50 (273)	1.47*
Developing vs Developed	0.37 ± 0.48 (5,164)	1.96**
Total sample	0.37 ± 0.48 (6,893)	

Businesses in the sample of least developed countries took strict measures by changing their operations, followed by developing and developed countries. Many developed countries waited to know the situation better (e.g., Poland, Greece) than responding to COVID-19 shock immediately. In contrast, many underdeveloped countries like Guinea had a fast response, maybe due to past experiences such as Ebola virus.

adapt during crisis events. We posit that firms with a flexibility capability are able to adapt and operate during crisis events such as the COVID-19 pandemic.

WHAT WERE THE FLEXIBILITY OPERATING MODELS ADOPTED?

After the initial shock of COVID-19, experienced in the spring and early summer of 2020, businesses made several changes to their operations. According to a Census Bureau survey, U.S. businesses made noticeable changes, including shifts in production, increasing remote workforce share, adopting online platforms, and changing total hours worked. For instance, online platform adoption and remote workforce percentage increased 24% and 4% above the national average, respectively.[9] Similarly, businesses worldwide adopted new operational changes such as the supply of inputs, raw materials, or finished goods, product and service offerings, online sales share, and remote workforce share. To explore different approaches to flexibility, we explore changes implement by firms across multiple countries in the following section.

SAMPLE DESCRIPTION AND METHOD

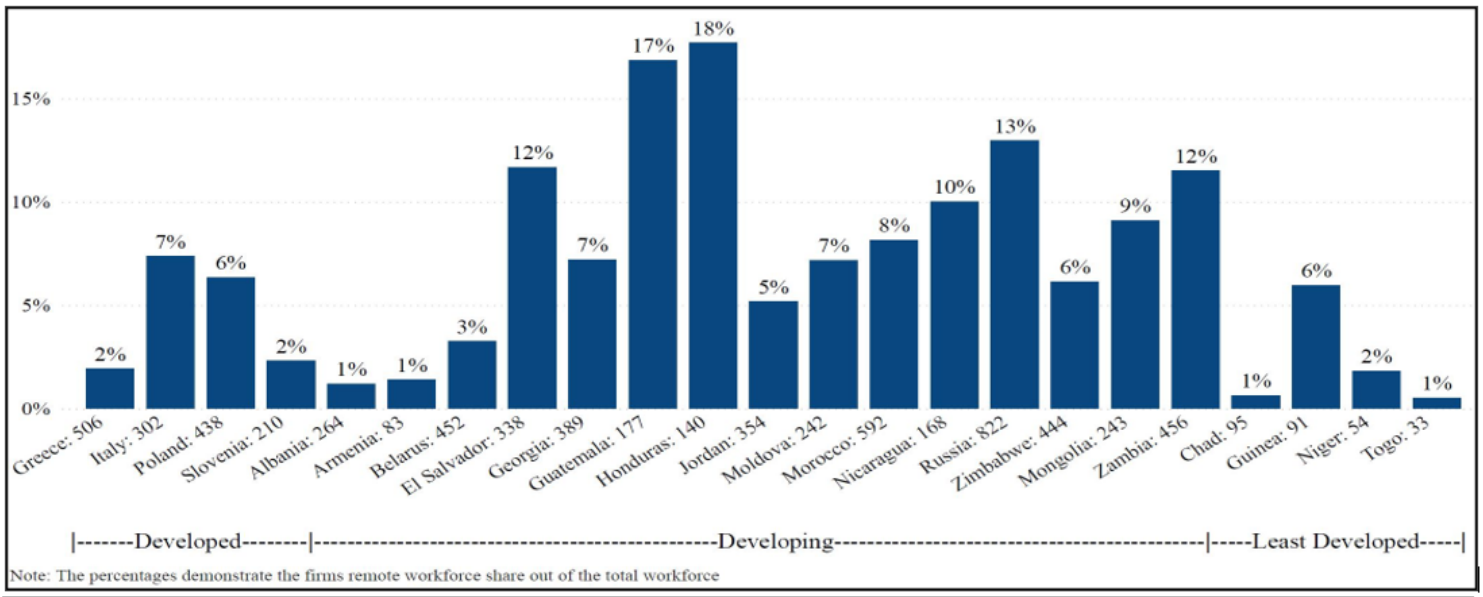
To examine how firms across the world responded and to the initial shock of the COVID-19 crisis, we examine secondary data regarding firms in 23 countries collected by a reputable international financial institution. The sample contains data for 6,893 firms across manufacturing, retail, and service industries, during May and June 2020. The data contain three sub-samples based on economic group types, including developing (5,164), developed (1,456), and least developed countries (273). The analysis consists of t-test comparisons across economic groups for the following items; changes in product and service offerings, remote workforce share, online sales percentage, total sales change percentage, the supply of inputs and raw materials change, demand of products and services change, and change in total hours worked.

FINDINGS

Figures 1 to 7 show how businesses across several countries and economic groups performed in the early stages of the COVID-19 crisis (May, June 2020). The flexibility of firms can be demonstrated by their ability to change their product and service offerings. The comparison of means (Figure 1) indicates that the less developed a country, the more flexibility firms have to adjust their product and service offerings. This may reflect the stage of COVID associated with the data, but several potential explanations assume the country's stage of development is reflective of the firms in that country. Firms in a more developed country may have

[9] http://www.census.gov

FIGURE 2. COUNTRY-WISE REMOTE WORKFORCE PERCENTAGE



Note: The percentages demonstrate the firms remote workforce share out of the total workforce

	Mean ± SD (N)	T-value
Developed vs. Least Developed	0.04 ± 0.12 (1,456)	2.26**
Developing vs. Least Developed	0.09 ± 0.20 (5,164)	4.92***
Developing vs Developed	0.09 ± 0.20 (5,164)	7.66***
Total sample	0.08 ± 0.19 (6,893)	

Businesses in the sample of developing countries have the highest share of remote workforce, followed by developed and least-developed countries. Developing countries increased the share of remote workforce faster comparing to businesses in developed and least developed countries.

instituted less change in product and service offerings as they became more rigid in the early stages of the pandemic.

Rather than taking immediate action, they may have adopted a more conservative, wait and see approach. It is also possible that more advanced firms have complex operations, and changing products and services takes more time for redesigning their operations. On the other extreme, firms in the least developed countries have non-industrialized products and fewer technical services, allow for more rapid change in related offerings. Experience such as the Ebola virus in some of these countries may also be the reason for product and service changes; experience with public health crises.[10]

The second variable concerns remote workforce percentage, as shown in Figure 2. The ability to work remotely provides a flexible work model for the completion of firm processes. In such firms, employees can shift the completion of their daily tasks and activities through the Internet and online platforms regardless of the geographical locations and boundaries.

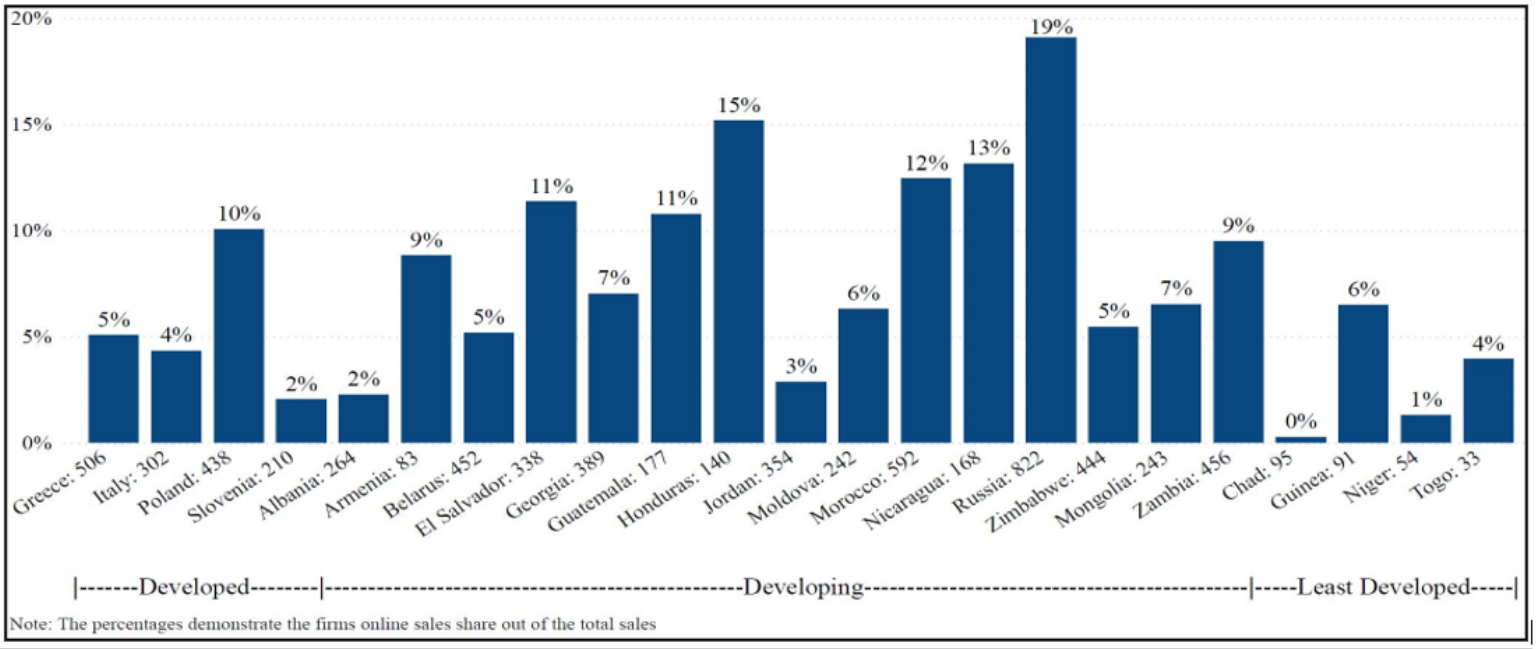
The remote workforce share variable measures the share of a firm's full-time workforce that is working remotely out of the total full-time workforce.

Figure 2 shows that in the initial stages of the COVID-19 crisis, businesses in developing countries such as Russia and Belarus had the highest share of the workforce working remotely, followed by businesses in developed countries such as Italy and least developed countries such as Guinea. As before, the reason firms in developing counties showing higher flexibility in their workforce could be reflective of a less industrialized stage of firms and the use of a less centralized production model; thereby, firms can expand other types of work modes more efficiently and promptly. Another probable reason could be that working remotely under new situations requires adapting to a new environment, confronting a new set of distractions, and experiencing an unprecedented fusion of work and private life. To continue working efficiently and being productive under new situations, firms need to understand, accept and support their employees' situations and needs. Therefore, firms in developed countries assessed the situation more and then took appropriate actions.

The third variable measures online sales percentage (Figure 3) and can be defined as a firm's ability to start or increase online activities in response to a new environment. The variable measures firm online sales as a percentage of total sales.

[10] Qureshi, A. I. 2016. "Economic and Political Impact of Ebola Virus Disease," *Ebola Virus Disease*, pp. 177-191.

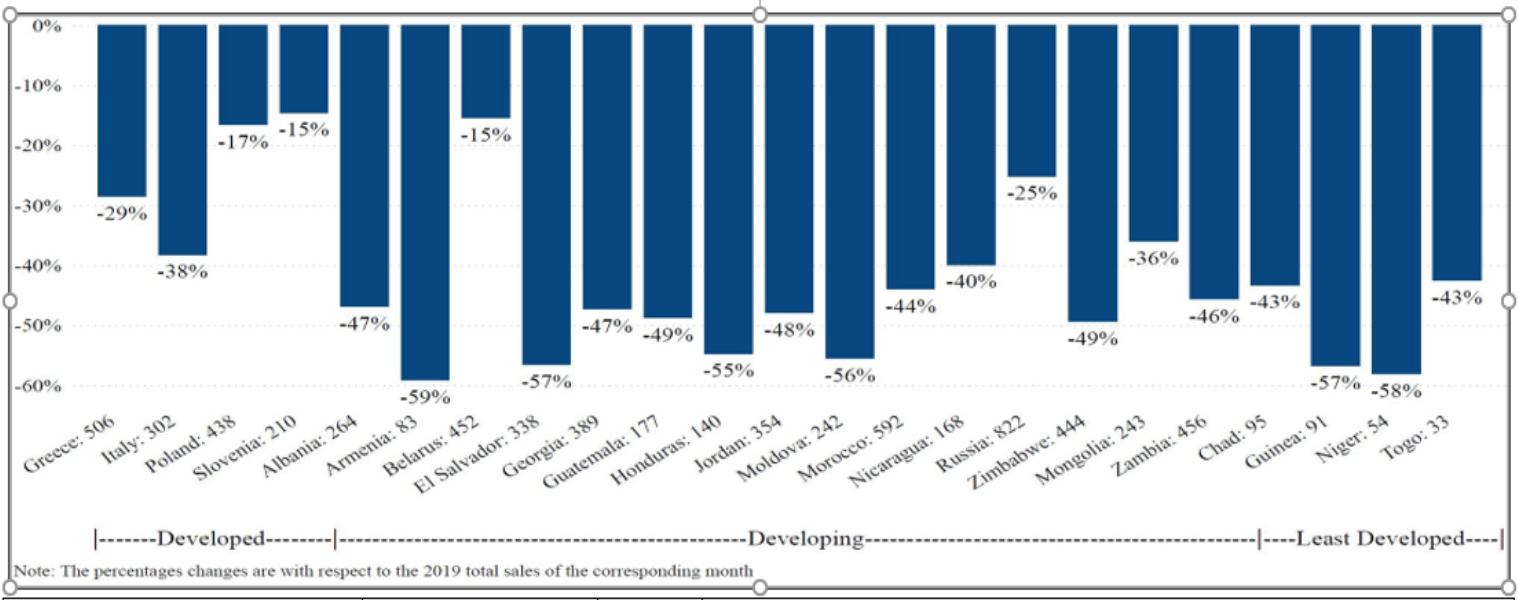
FIGURE 3. COUNTRY-WISE ONLINE SALES PERCENTAGE



Note: The percentages demonstrate the firms online sales share out of the total sales

	Mean ± SD (N)	T-value	
Developed vs. Least Developed	0.06 ± 0.15 (1,456)	3.19***	Businesses in the sample of developing countries have the highest share of online sales, followed by developed and least-developed countries.
Developing vs. Least Developed	0.10 ± 0.21 (5,164)	5.39***	
Developing vs Developed	0.10 ± 0.21 (5,164)	6.56***	
Total sample	0.09 ± 0.19 (6,893)		

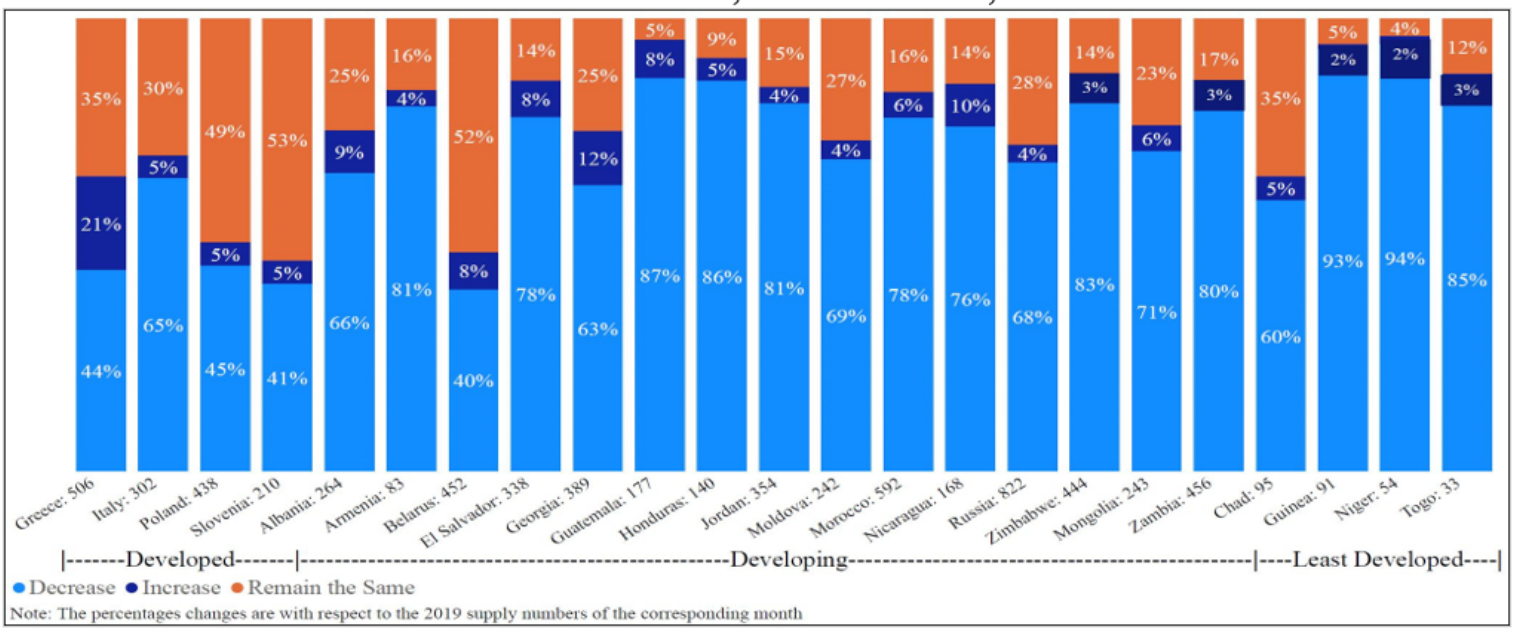
FIGURE 4. COUNTRY-WISE TOTAL SALES CHANGE PERCENTAGE



Note: The percentages changes are with respect to the 2019 total sales of the corresponding month

	Mean ± SD (N)	T-value	
Developed vs. Least Developed	-0.25 ± 0.33 (1,456)	12.15***	Businesses in the sample of developed countries have the biggest change in their total sales, followed by developing and least-developed countries.
Developing vs. Least Developed	-0.41 ± 0.36 (5,164)	4.25***	
Developed vs. Developing	-0.25 ± 0.33 (1,456)	15.74***	
Total sample	-0.42 ± 0.36 (6,893)		

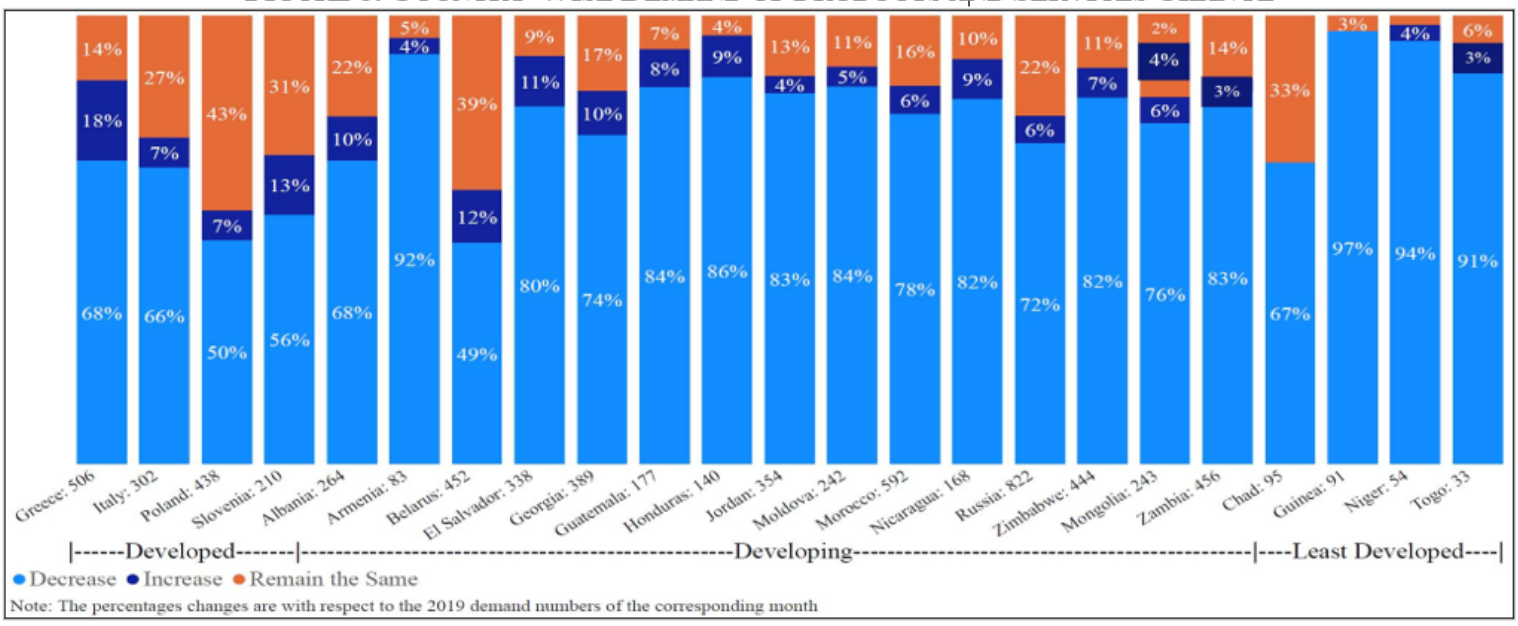
FIGURE 5. COUNTRY-WISE SUPPLY OF "INPUTS, RAW MATERIALS, OR FINISHED GOODS" CHANGE



Note: The percentages changes are with respect to the 2019 supply numbers of the corresponding month

	Mean ± SD (N)	T-value	
Developed vs. Least Developed	-0.38 ± 0.67 (1,456)	9.44***	Businesses in the sample of developed countries have the highest change in their supply of "inputs, raw materials, or finished goods" followed by developing and least-developed countries.
Developing vs. Least Developed	-0.66 ± 0.58 (5,164)	3.28***	
Developed vs. Developing	-0.38 ± 0.67 (1,456)	15.75***	
Total sample	-0.61 ± 0.61 (6,893)		

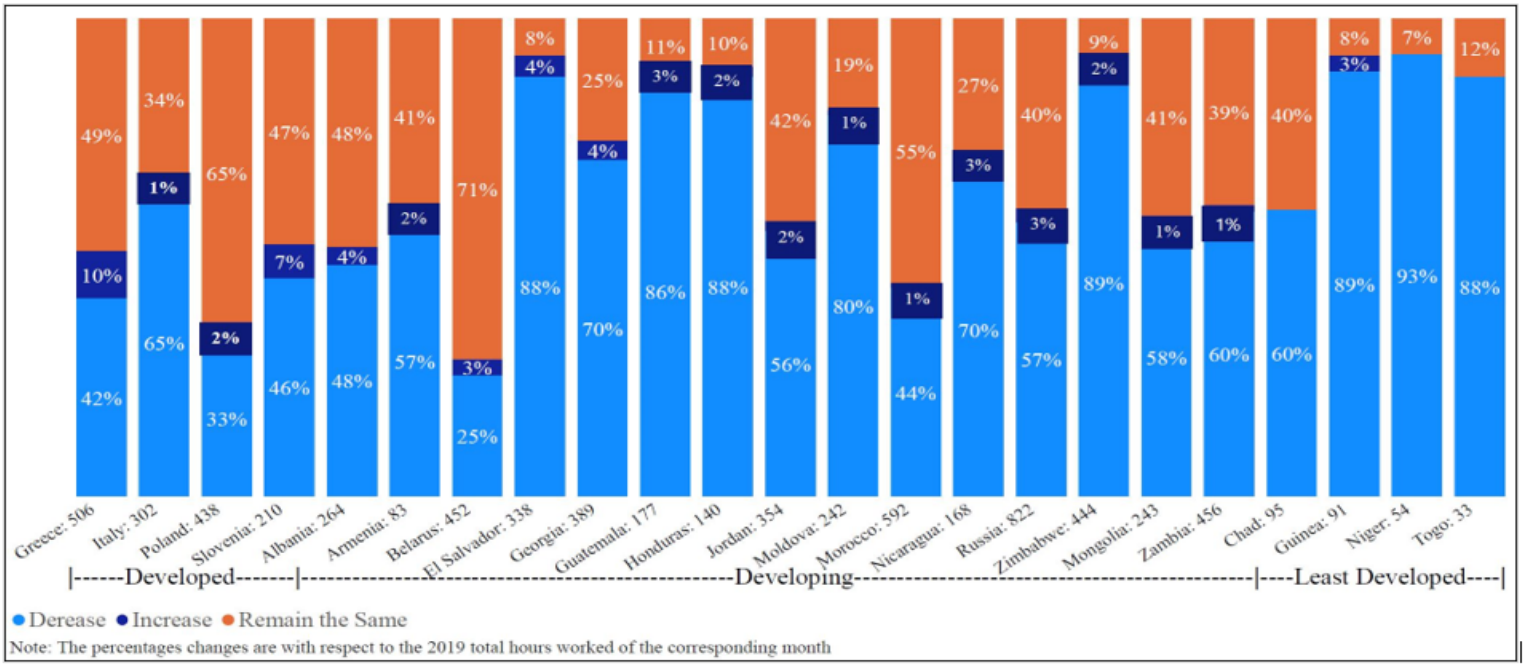
FIGURE 6. COUNTRY-WISE DEMAND OF PRODUCTS AND SERVICES CHANGE



Note: The percentages changes are with respect to the 2019 demand numbers of the corresponding month

	Mean ± SD (N)	T-value	
Developed vs. Least Developed	-0.48 ± 0.69 (1,456)	8.19***	Businesses in the sample of developed countries have the highest change in their products and services demand, followed by developing and least-developed countries
Developing vs. Least Developed	-0.69 ± 0.60 (5,164)	4.25***	
Developed vs. Developing	-0.48 ± 0.69 (1,456)	10.75***	
Total sample	-0.65 ± 0.62 (6,893)		

FIGURE 7. COUNTRY-WISE TOTAL HOURS WORKED CHANGE



Note: The percentages changes are with respect to the 2019 total hours worked of the corresponding month

	Mean ± SD (N)	T-value	
Developed vs. Least Developed	-0.39 ± 0.59 (1,456)	10.58***	Businesses in the sample of developed countries have the biggest change in their total hours worked, followed by developing and least-developed countries
Developing vs. Least Developed	-0.59 ± 0.54 (5,164)	5.74***	
Developed vs. Developing	-0.39 ± 0.59 (1,456)	12.65***	
Total sample	-0.56 ± 0.56 (6,893)		

Similar to remote workforce share, businesses in the sample of developing countries have the highest share of online sales, followed by developed and least-developed countries. While again reflective of the complexity of businesses within country groups, the results demonstrate that online capabilities are extending to firms at all stages of development.

The next variable is the total sales change percentage, as shown in Figure 4. This variable compares a business's last month's sales with the same month one year earlier (2019), as a percentage. Last month's sales can vary from May-20 to Jun-20. Businesses in the sample of developed countries have the largest change in total sales, followed by developing and least-developed countries. Figure 4 shows businesses in developed countries had the highest negative sales drop in the early stages of the COVID pandemic compared to other economic groups.

The fifth variable is the change in supply of inputs, raw materials, or finished goods, as shown in Figure 5. It shows the year-over-year change in a business's supply of raw materials and inputs. Like total sales change percentage, businesses in the sample of developed countries have the highest change (negatively) in their supply of "inputs, raw materials, or finished goods" followed by developing and least-developed countries.

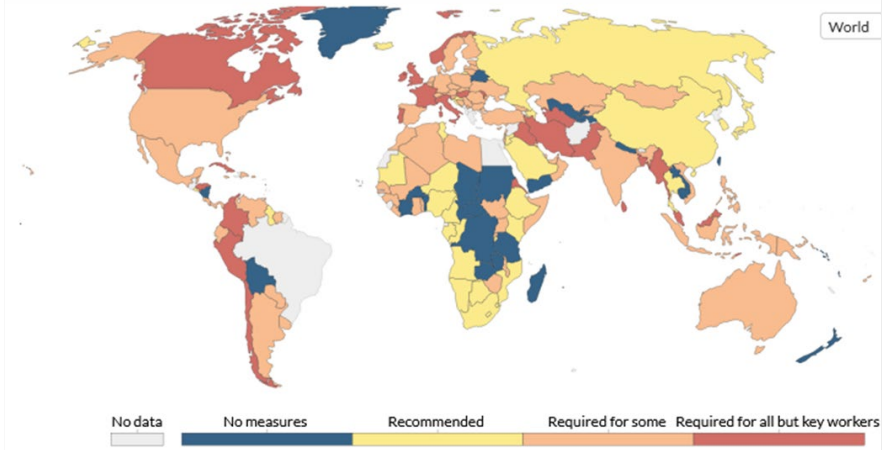
The sixth variable is the demand for products and services change and is shown in Figure 6. It determines how the COVID-19 crisis has impacted a business's demand for products and services. It is measured by comparing the business's demand for products and services in May-20 or Jun-20 with May-19 or Jun-19. Similar to the supply of inputs and raw materials change, businesses in the sample of developed countries have the most significant change (negatively) in their products and services demand, followed by developing and least-developed countries.

The final variable is the change in total hours worked (Figure 7). The change in total hours worked demonstrates the impact of the COVID crisis on business activity. It is measured by comparing the business's total hours worked in May-20 or Jun-20 with May-19 or Jun-19.

Similar to demand for products and services, businesses in the sample of developed countries have the highest level of change (negatively) in their total hours worked, followed by developing and least-developed countries.

Taken together, results show that firms reacted differently in the early stages of the COVID crisis. In developing countries, firms responded more immediately than firms in developed and least developed countries in an increase in the share of the remote workforce and increased movement to online sales. Firms in the least developed countries made immediate changes in their product and

FIGURE 8: WORKPLACE CLOSURES DURING THE COVID-19 PANDEMIC, MARCH 16, 2021 (SOURCE: OURWORKDINDATA.ORG/CORONAVIRUS)



service offerings, while firms in developed and developing countries were more conservative and waited before reacting in these areas with depth. Moreover, firms in developed countries experienced the most remarkable changes in their demand for products and services, the supply of inputs and raw materials, and total hours worked after the first shock of COVID-19. Collectively, the data indicate there are varying levels of flexibility within firms. These differences are most likely based on their stage of maturity and the complexity of their business models.

The results raise questions for a further examination given the noticeable differences among firms across different countries and economic groups[11]: (1) How swiftly do firms decide to apply changes in their product and service offerings (2) How do firms adopt new changes in their operations during a crisis, and (3) What changes did firms continue to make as the COVID pandemic matured? More importantly, as countries decide to relax regulations regarding workplace closures as the vaccine distributions are progressing (see Figure 8 about worldwide workplace closures on March 16, 2021), what changes will take hold and remain after the pandemic ends across the globe?

CONCLUDING REMARKS

The COVID-19 crisis forced firms across the world to undergo significant changes in their business operations. On average, firms in different economic groups and countries responded differently for various yet known reasons. Firms in developing countries may have had better contingency plans for unexpected crises, or their business operations were more adaptable to new situations. Firms in least-developed countries may have been able to make changes to their product and service offering given hands-on experiences with previous public health events.

Firms in developed countries may have experienced the highest decline in their supply, demand, total hours worked, and total sales as their global operations were more dependent on an international supply chain that was temporarily shut down. Future research should investigate how firms at different development stages have been able to develop the flexibility to adapt their business models during times of crisis. Besides, country-level institutional factors such as governance quality, transparency, and digital readiness should also be examined as these factors have been identified as contributors to firm heterogeneity.[12]

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[11] Seetharaman, P. 2020. "Business Models Shifts: Impact of Covid-19," *International Journal of Information Management* (54:2), pp. 1-4.

[12] Fainshmidt, S., Judge, W. Q., Aguilera, R. V., and Smith, A. 2018. "Varieties of Institutional Systems: A Contextual Taxonomy of Understudied Countries," *Journal of World Business* (53:3), pp. 307-322.